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Defense Industrial Conversion: Background, Experience, and Possibilities for Central Europe

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INTRODUCTION

The end of the Cold War has resulted in a global environment which is much less volatile than it has been for the past eighty years. One major outcome of this easing of world tensions has inevitably been a significant reduction in spending for defense. The eventual size of the reductions will vary from country to country, but they are already having a substantial impact on the defense industrial sector of a number of countries which have been engaged in weapons production, including the United States, the Commonwealth of Independent States, especially Russia and Ukraine, and the former Warsaw Pact members of Central Europe, notably Poland, Czechoslovakia, and Hungary.

The major task facing these countries in light of these reductions will be the conversion of all or part of their industrial infrastructure from weapons manufacturing to the production of civilian goods. How large a task this will be and how smoothly the process goes will depend heavily on the size of each country's defense sector, and on the economic structure and political climate in which conversion takes place.

This analysis will examine the process of defense industry conversion from the perspective of certain analysts who have studied it extensively and then look at how the task is being approached in the Central European countries of Poland, Czechoslovakia, and Hungary.

DEFINITION

Those who have studied defense industry conversion define it differently. Arthur Alexander of the Japan Economic Institute, who has studied the conversion phenomenon in a number of countries, generally sees it from a macroeconomic standpoint as just "one form of the many adjustments and adaptations faced by modern, industrial, dynamic economies."[1] Viewed from this perspective, "defence industry conversion in the twentieth and twenty-first centuries does not differ in its basic form from the other industrial transformations witnessed in the past."[2] Within this broad definition, Alexander regards the actual transformation of defense production lines at the plant level to the production of civilian goods as just one of the ways of converting defense industry to non-military production.

Other analysts, including John Lynch and Milton Leitenberg define conversion more narrowly, and view it from the microeconomic, or local, level, what Alexander calls "the establishment level." Leitenberg sees defense conversion as "the utilization of existing defense industrial plant and personnel at the same factory site to produce non-military products."[3] Lynch includes in his survey of conversion experiences the concept of conversion as not just an industrial and economic process, but as a specific program which includes the intervention of the government to facilitate the transition of a defense plant,

either in part or in whole, from defense to civilian production.[4] While Alexander does not exclude the possible involvement of the government in the conversion process, he does not regard direct governmental involvement as necessary to it.

Kenneth L. Adelman, former director of the U.S. Arms Control and Disarmament Agency, and Norman R. Augustine, chairman and CEO of Martin Marietta Corporation, a major American defense-contracting firm, outline four general models for transitioning defense industries into commercial pursuits.[5]

First is the "insertion model," where commercial work is simply assigned by the central government to defense manufacturers. What a manufacturer produced before is largely irrelevant to what may be assigned to him. Underlying this model is the necessity of a centrally planned economy such as existed in the former Soviet Union and, to a lesser degree, in the former Warsaw Pact countries.

Another model is the "conversion model" whereby defense contractors attempt to apply their technology and manufacturing capabilities to commercial products. This is the most commonly understood concept of defense conversion (see Leitenberg's definition above), and the one most often explored in the U.S. in the past. It has not often met with success.

A third model is the "evolution model," which is characterized by "a gradual movement into selected commercial markets closely related to the basic skills of existing defense firms -- e.g. endeavors marked by high-tech, systems engineering, 'large' products, low-rate production, and arrangements with a few large customers, be they governments or major corporations." Despite the limited opportunities available under this model, Adelman and Augustine regard this as the model best suited to the U.S. defense industry.

A fourth model is the "substitution model," which entails government assistance and incentives to small entrepreneurial enterprises which can selectively hire away the employees of existing defense firms and even buy or rent parts of existing defense plants. Essential to the model is that the new firms not be under the management of the old defense industries, but simply provide employment to former defense workers.

The term "conversion," as used in this paper will generally refer to the broader process of economic adjustment, with these different models included under the term. The primary reason for this is that the term has come to be a commonly-used one, and despite its periodic application to narrower contexts, it can be conveniently used to describe all of the various ways in which different countries have approached the transitioning of portions of their defense industry to civilian production.

DEFENSE VS. CIVILIAN SECTORS

Despite Alexander's observation that defense industry conversion is not substantially different from other kinds of economic transformations, it has received, and is again receiving, somewhat greater attention than other types of economic adjustments. This is probably due to the criticality of the defense sector to national security and the consequent close linkage between the defense sector and the government. This relationship has been the major contributing factor to the differences between the defense sector and the civilian economy.

Some of these differences between the two sectors make economic adjustment more difficult for the defense sector than it is for civilian industry. This is especially the case in a free market economy like that of the U.S., where the degree of governmental involvement in the defense sector is vastly greater than it is in the civilian sector, and has contributed to behaviors in the defense sector which serve to handicap defense firms when they are forced to operate in the commercial sector.

Besides its being more closely bound to government than civilian industry, "defence production tends to be more R&D-intensive, uses a larger proportion of advanced technologies and production techniques, and employs more highly-skilled production workers, engineers and scientists."[6] Adelman and Augustine list further differences, such as lack of know-how in mass

marketing and in making high-volume, low unit-cost items, a non-existent distribution network, little knowledge of consumer tastes, market research, or how to price to compete in the commercial marketplace.

All of these factors make the transition from the defense sector to civilian production more difficult than moving from one part of the civilian economy to another, no matter what economic system is in place. These factors have their most serious effect on the mobility of defense workers, whose skills, because they are so specialized, are not easily adaptable to civilian production. These same factors also have an impact on the defense companies whose technologies and production techniques which are not easily transferable to civilian production.

Jacques Gansler[5] identifies a whole series of additional differences between the two sectors which are particularly prominent in a free market economy. Among these differences are the contrast in markets, where the defense sector has a single buyer, the government, whereas the civilian sector has many potential customers. From the supply side, there are very few suppliers of a given item in the defense sector. These two key differences, with all their attendant ramifications, severely diminish the competitiveness of a firm which has operated primarily in the defense industry environment. When a country's defense spending is reduced, not only is there little market for the products which the firm has been making, but it is

faced with trying to enter an established civilian market with new products but little experience in that market.

Leitenberg expresses somewhat of a minority view on the matter of the differences between the defense and commercial sectors. He is not as pessimistic about the transferability of defense worker skills to the civilian sector, and believes that "there is a substantial amount of exaggeration in the view that the skills of defense industrial employees differ greatly from those producing civilian products." [9]

ECONOMIC SYSTEMS

While features inherent to the defense industry have a bearing on how it undergoes economic adjustment, the major factor which affects how the industry negotiates the passage from military to civilian production is the economic system in which it operates. This was the finding of Alexander in studying conversion experiences in the U.S., China, Japan, and the then Soviet Union, all of whom had different forms of economic structure.

The primary way in which economic systems affect the process of defense industry conversion is by determining the general focus of conversion. While most discussion of defense conversion has largely surrounded the individual plant, or establishment,

level, that is not necessarily where the conversion process generally takes place. Whether it does take place primarily at that level or not is dependent on the country's economic structure. Alexander found that:

> "the more rigid and inflexible the economic management and the more immobile the resources, the more conversion will - and must - occur at the establishment level. Conversely, the greater the flexibility of the economic agents and the more mobile the resources, the more conversion is likely to take place in a diffused manner throughout the economy at large."[10]

Because market economies provide an infrastructure (unemployment insurance, housing, etc.) which facilitates the mobility of resources to other areas of the economy, conversion at the plant level is generally unnecessary and inherently inefficient. On the other hand, since centrally planned economies lack the same kinds of supports, they have little choice but to focus their conversion efforts on the individual plant, thus Adelman-Augustine's recommendation of the "substitution" model for the countries of Eastern Europe.

There have been a number of studies [11] done of U.S. defense industries which illustrate this finding. These industries for the most part attempted to diversify their operations to include civilian production, i.e., to convert part of their production resources to non-defense purposes. When these efforts have met with any success, it has generally entailed the building of entirely new plants to produce the civilian goods rather than

converting existing defense plant facilities. However, even when new plants have been built, success in such diversification has been limited.

> "The more common occurrence ... is for employees to leave their old places of employment to seek opportunities in new economic fields and different geographical areas, and for firms to reduce their activities in defence by shutting down or selling off their idle facilities, by selling equipment, or by running plants with excess capacity. Therefore, a good deal of conversion in the United States occurs through the mobility of workers and capital equipment, rather than through diversification at the establishment level."[12]

In a centrally planned economy, the focus of conversion is almost necessarily at the individual plant level, since the economic system does not foster the kind of resource mobility which is a prerequisite for conversion to take place in the economy at large. This has been found to have some short-term potential, since in the planned economies, the defense sector has benefitted from preferential treatment by the government. Consequently it has a large and technologically progressive capital stock, a well-skilled labor force, and experienced management which can be applied to civilian production. In addition, most defense plants in the former Soviet Union and the Warsaw Pact countries of Central Europe have been involved in the production of some civilian goods. However, in the case of the former Soviet Union, Alexander observes that: "Over the longer term, the deep systemic problems of the Soviet economy will impose themselves on the defence industry's production of civilian items."[13]

In summary, Alexander found that "market economies perform the task of change more smoothly and with greater efficiency and effectiveness than centrally planned economies" [4] The workings of the two systems do have different effects on the workers. In general, the major burden for conversion in a free market economy is borne by the individual worker who is faced with identifying other industries to which to carry his skills. In the centrally planned economies, the burden is borne mostly by the society at large which insulates the workers from the effects of displacement by focusing conversion at the level of the individual plant. There is theoretically no unemployment in planned economies.

The task of converting the defense industries of Central Europe to civilian production is especially complicated by two factors. The first is the fact that these industries have, for the past forty years, been operating in a centrally planned economic environment, which in itself will make the conversion process more difficult for the reasons outlined above. The second factor is the fact that, at the same time as these countries are endeavoring to convert their defense industries to civilian production, they are also in the process of migrating to free market systems. It is Alexander's view that these two processes cannot take place effectively in tandem. Market transition will have to precede defense industry conversion for conversion to have any long-term chance of success.

ROLE OF GOVERNMENT

What the government can do to facilitate the defense conversion process is also dependent upon the nature of the economic structure. In the formerly centrally planned economies of Eastern Europe which are now in the course of economic transition, the government can take a key direct role in the fate of defense workers and even old defense plants by providing financial assistance to companies to begin producing new civilian products to which defense technologies and worker skills can be adapted, and developing a plan for guiding the adjustment process. This is consistent with the "substitution model" mentioned above. The government can also subsidize the individual plant and its workers until alternative civilian products can be identified and new markets located. This is actually little different from the unemployment insurance which provides a safety net for workers in Western economies.

Unfortunately, central management is a difficult undertaking at best, and Alexander found that in the case of both China and the former Soviet Union, this was not the route taken in their previous conversion experiences. Both found central management of conversion too difficult, and they found it more feasible to allow for greater flexibility and worker mobility to take place in the conversion process. From all indications, this seems to be the course being taken in Eastern Europe during the current round of conversion as well.

As implied in the above, in a market economy, the most feasible governmental role is an indirect one of supporting labor mobility through education and training, unemployment insurance, and policies that promote the availability and affordability of housing. There are those who have advocated a more direct role for the U.S. government in not only planning for alternative uses for defense facilities, but identifying and subsidizing new civilian products, and providing special benefits for displaced defense workers.[13] Much of this constitutes the equivalent of an industrial policy for the defense industry, a concept which this country has consistently resisted.

DEFENSE INDUSTRY IN CENTRAL EUROPE

Historically, the defense industries in the former Warsaw Pact countries of Central Europe have functioned as satellites of the Soviet defense industry. Their primary markets have been the Soviet Union and other Warsaw Pact members, with a much smaller percentage of sales to Third World countries. Their production decisions have not been made as much on the basis of market externalities as on the larger defense needs of the Soviet bloc. The table in the appendix shows a breakdown of the major exporters of arms over the period 1971-1988. It shows that Czechoslovakia ranked seventh in the world during that period, with Poland right behind.

A byproduct of these industries' dependence on decisions made in Moscow is the fact that the defense industries of Central Europe have generally mimicked the Soviet model of defense production, in that many defense facilities have also produced relatively large amounts of civilian goods.[16] The major reason for this dual production was to keep plants operating and ready for rapid defense expansion in the event of war. Leitenberg estimates that across the Soviet defense industry, the breakdown of production was about 55% defense and 45% civilian production. This same model has generally prevailed in Central Europe, though similar distribution figures are not available.

The decision to convert the defense industries of Central Europe to civilian production is not based solely on the reduction of defense needs resulting from the lowering of global tensions. The countries of Central Europe, specifically Czechoslovakia, Poland, and Hungary, in the aftermath of the overthrow of Communist rule, established an implicit policy goal to get out of the arms race altogether.[17] As will be seen, this decision has been indefinitely deferred in Czechoslovakia, at least for the short term, because of certain internal reasons.

As has been discussed above, a factor which further complicates the task of defense industry conversion in the countries of Central Europe is the fact that these countries are also undergoing radical economic transformation. Under the old economic regime, the defense industry operated within a centrally

controlled environment where it was accorded preferential treatment relative to the civilian sector. This has meant more advanced technology, a highly-skilled work force, and better capital stock, all of which could have been useful to defense plant conversion if economic structures had remained in place. However, the decision by these countries to establish market economies leaves these defense industries in a position where their prior strengths are not as important because they are unable to compete effectively in the changed economic environment. This has prompted some of the countries to leave some of the old economic controls in place for the defense sector even while espousing a free market policy. On the whole, however, Dr. Steven Popper sees these countries currently trying to "(hang) on until their economies have been sufficiently transformed to provide alternative employers, increased domestic demand for other products, and more information on what might be profitable for the present arms manufacturers to do."[13] In the meantime, there are still plans to attempt conversion at the plant level, though their prospects for success appear questionable.

Apart from these factors which, to varying degrees, affect all the countries of Central Europe in their defense conversion process, there are also political and economic factors which are unique to each of the countries in question which will have an effect, either positive or negative, on how defense conversion proceeds. The following discussion will look at the defense

industry in the countries of Czechoslovakia, Poland, and Hungary and the factors which will affect the defense conversion process in those countries. Czechoslovakia will receive the major focus, both because at this point more information is available on Czechoslovakia, and because the complicating political factors there are more significant than in either Poland or Hungary. In addition, many of the observations about Czechoslovakia's defense industries will be applicable to the industries in the other two countries, especially Poland.

CZECHOSLOVAKIA

Czechoslovakia, whose current official name is the Czech and Slovak Federal Republic, was the second largest weapons producer, next to the Soviet Union, in the Warsaw Treaty Organization, the major weapons produced being tanks, armored personnel carriers, artillery, and a jet aircraft trainer. The bulk of the weapons produced in Czechoslovakia, approximately 75%, were exported to other Warsaw Pact members and to developing countries in the Third World. While the Czech Republic was the center of most of the country's weapons production during the pre-World War II era, most of the arms production which has developed since World War II has been located in the Slovak Republic, which has been the more underdeveloped of the two republics, and which has about one-third of the country's population. The decision to locate so much of the defense industry in Slovakia was made after the

Communists assumed power, because of Slovakia's location next to the Soviet border. Though estimates vary, some figures indicate that about 16% of Slovakia's industrial work force has been employed in the arms industry.[13] The major defense industry located in the Czech Republic has been the manufacture of training aircraft for the Soviet air force.

After the democratic revolution of 1989, Czechoslovakia committed itself to a severe reduction of arms production both for the practical reason of a shrinking market, and for the larger reason of the country's reputation in the international community. Its first expressed goal in January 1990 was to end its weapons exports entirely and to halt tank production by the end of 1990. This goal has since been modified, and certain political and economic realities, discussed below, have placed many of the country's conversion plans in limbo.

The fact that the bulk of Czechoslovakia's defense industry is located in the Slovak Republic is significant because of its political ramifications. While the relationship between the Czechs and the Slovaks has generally been benign, both being closely-related Slavic peoples, the Czech Republic has been historically the more economically, industrially, and culturally more advanced of the two, and this has been the source of some periodic animosity. In the aftermath of the revolution, the decision of the Federal government to end the export of arms had the most profound economic impact on the Slovak Republic, since,

as noted above, most of the country's twenty-eight weapons plants are in eastern Slovakia, and unemployment in the region as a result of the defense downturn is now at 15%, double the rate of the rest of the country.[16]

This led the Slovak Republic to feel that the Federal government, in its commitment to conversion of defense industries, was not being sufficiently sensitive to the plight of Slovakia, and the resulting tension has fueled an already-developing movement toward an independent Slovak state. In the face of this pressure, the Federal government backed off from commitments to limit arms production and shifted the power to make economic and industrial decisions for Slovakia to the Slovak government. The result of this shift has been a slowing down of the conversion process and a partial resumption of the export of arms. It is the contention of the Slovak government that the continued export of arms is temporarily necessary to provide needed hard currency to pay for eventual conversion.

Because of the situation in Slovakia, the country as a whole has had to adopt a more gradual approach to establishing a free market economy, unlike the "shock therapy" which Poland has opted to use. The pace of the reform has been slow, as has been the case in most of Eastern Europe. Thus far, Czechoslovakia has met with some success in attracting foreign investment, primarily from Germany. Very little of this investment, however, has been directed toward the defense sector. This is somewhat ironic,

since the favored treatment accorded the defense sector under the Communist regime prior to 1989 made the defense sector the most technologically advanced of the country's industries, this despite the fact that the defense sector accounted for only 4% of net industrial output in 1988, the peak year of defense production. Unfortunately, much of the technology in the Slovak defense sector is not easily transferable to civilian production. Dr. Popper observes that "60-90% of investments in the Slovak arms factories in 1980-90 were in special purpose technologies not well-suited to other purposes."[4]

A further irony is the fact that the most effective route to defense industry conversion is through economic reform, but the unwillingness to confront the challenge of conversion immediately in Slovakia will not only prolong the process of economic reform, but will make it ultimately more painful, especially for the Slovak Republic.

POLAND

The defense industry in Poland has been engaged primarily in the production of tanks and aircraft for export. On the whole, Poland's defense industrial sector has been relatively less important to its economy than has been the case in Czechoslovakia, despite the fact that it ranked just behind Czechoslovakia in arms exports from 1971-88. One reason for this

is that, to a greater degree than in Czechoslovakia, while many enterprises are involved in some arms production, few have that as their exclusive focus.[22] Geographical concentration is also not a factor in Poland.

In Poland, the political and economic factors which affect the defense conversion process are not unlike those affecting the other sectors of the economy. The political circumstances are currently characterized by fragmentation. The elections in October resulted in a splintered parliament in which no party won more than 13% of the vote. This has led to a lack of leadership which has affected the progress of the country toward a market economy. Privatization has lagged, and investment has been put on hold in the absence of any strong national leader. All of this will have an impact on conversion, since, as Dr. Popper expects, "the peculiarities of conversion are likely to be subsumed by the larger issue of general industrial restructuring."[23]

HUNGARY

Of the three prominent countries of Central Europe being looked at here, Hungary has made the most progress toward shedding the remnants of central planning. It has not had a large defense industry and is not faced with the magnitude of conversion challenge which confronts Czechoslovakia and Poland. Furthermore, Hungary's primary defense industry has been defense

electronics, which will be relatively easily transferable to civilian markets.

In addition, from an economic standpoint, Hungary's unemployment level is lower than both Poland and Czechoslovakia (about 6.5%), and its inflation rate is about half that of the other two countries. These factors, plus the fact that Hungary has adopted a totally free market approach to conversion will allow any displaced workers from the defense sector to be absorbed into the other sectors of the economy. In general, it is likely to be only a matter of a brief time before there is no identifiable separate defense industrial sector in Hungary.

CONVERSION PLANS AND RECOMMENDATIONS

Despite the serious question of the feasibility of converting defense facilities to civilian production, particularly in the current economic environment, there has been some examination of the conversion prospects for some of the defense industry. This has come to be regarded as virtually inevitable, since all the years of central economic planning has rendered the defense industries unable to pursue any feasible alternatives in the immediate. As noted above, many of the defense industries of the old Warsaw Pact have been involved in civilian production as well. For example, the tank plants in Slovakia have also been engaged in the production of tractors,

construction and road-building machinery, railroad flatcars, river barges, and locomotives. Leitenberg notes that this experience made Czech officials initially optimistic about the prospect of increasing the proportion of existing civilian goods already in production. In mid-1990, plans were made to expand the production of, among other things,

> "consumer engineering products, consumer electronics, hydraulic elements and aggregates. trucks, robots and manipulators, combustion engines, machine-tools and single-purpose machines, tractors, building machines of all types, excavators, agricultural and textile machinery, printing and copying machines, airconditioning elements, laser technology, vacuum products, semi-conductor oscillators, sources for ion vacuum pumps, stroboscopes, communication exchanges and other technology, control systems for machine tools, technology for electronics, labor safety means, special optical elements, as well as artificial kidneys, all sorts of equipment for ecology, shielding material for nuclear power stations."[44]

Unfortunately, there is question as to how these plans have materialized, and the high unemployment rate in Slovakia at the end of 1991 would seem to indicate that they have not met with much success.

It is the view of Leitenberg that it might be feasible to match the conversion potential of the defense industries of Central Europe with two important needs of the region, energy and pollution control. Czechoslovakia badly needs energy sources and the entire region is in desperate need of industrial pollution control equipment. Leitenberg proposes that the existing defense industrial plants be used to produce materials-recycling plants,

municipal waste-to-energy production plants, compactors, and dump trucks to address the energy problem, and industrial pollution control equipment, which involves essentially large fabricated metal products.[25] He sees the existing facilities as potentially adaptable to these uses without the need for heavy additional investment, which has been slow in coming anyway.

Adelman and Augustine propose seven steps which they regard as important to facilitating the shift from defense production to civilian production.[26] Some of these are especially critical to the countries of Central Europe.

The first step is to assure political stability. Because foreign investment will be essential to the economies of Central Europe as they evolve toward a market structure, an uncertain political environment will have an adverse impact on economic growth. Both Poland and Czechoslovakia are currently struggling with political tensions.

Second, what Adelman and Augustine call a "business-friendly infrastructure" must be built. This includes a legal system to protect property, a beneficial tax policy, and an economic safety net for displaced workers.

Third, privatization should be facilitated both through an openness to foreign ownership and special tax incentives to create jobs. Privatization is occurring in all three countries

under study. Unfortunately, the one sector of the economy which remains under state control, at least in Czechoslovakia, is the defense industry.

Fourth, conversion must be need-driven, not capacity-driven. One of the temptations in pursuing a conversion strategy is to determine the uses to which defense-production facilities can be applied without first determining societal needs. It is one of the key reasons why so many past conversion attempts have proved to be futile. Leitenberg's suggestions above are consistent with this concept.

Fifth, ex-communist countries must develop sources of hard currency by doing what they do best. Adelman and Augustine mention agriculture and tourism as potential sources. Ironically, Slovakia regards continued arms production as one of these sources, and the question arises as to whether this decision will make it that much more difficult for the country to wean itself away from defense production.

Sixth, the preferable way of utilizing defense facilities is not to simply convert the manufacturing capacity to some civilian use, but to permit outside entrepreneurs to start entirely new business, using the former defense facilities if necessary. This constitutes the model of "substitution," which entails the two-step process of shedding defense assets and encouraging the absorption of labor and capital by newly created companies.

Finally, Adelman and Augustine propose interim measures by the West to preclude top-notch ex-Soviet scientists and engineers from pursuing opportunities in potentially hostile countries. They compare such measures to paying American farmers not to farm.

SUMMARY

In light of this analysis of defense conversion, particularly in the countries of Central Europe, it would appear that effective conversion of defense industries in Central Europe will only occur after economic reform has been completed. Because this process is apt to take longer than originally anticipated, attempts to convert individual plants to civilian production in the meantime, especially in Poland and Czechoslovakia, may be not only useful but necessary. Thus far, these attempts seem to have been largely unsuccessful. If there is any chance of success, it is likely to be greater for those factories which have been engaged in dual-use production, although so far the identification of alternative civilian products and markets has not been able to keep pace with the loss of defense markets.

The conversion process will be more difficult for the producers of ground weapons than for either aircraft manufacturers or producers of electronics, since civilian markets

for the latter two will likely be more easily located. The technological adjustments needed for producers of ground weapons to adapt to the production of civilian goods are far more extensive than those required in the other two fields. In fact, there is a great deal of pessimism among analysts over the prospects of such technological adjustment. Leitenberg's proposals in this regard may have some merit.

In the short term, both Poland and Czechoslovakia are likely to continue a certain level of defense production, as well as to continue to subsidize the defense industry until market reform is complete, unlike Hungary, which has withdrawn all subsidies. Whether this continued production is an indication that these countries have altered their policies of abandoning the arms trade in the long run remains to be seen. In the case of Czechoslovakia, this situation will be significantly affected by the Slovak Republic's decision on becoming an independent state. If that should occur, the decision to convert defense industries will be much more difficult, since they represent such a large portion of the republic's economy.

APPENDIX

MAJOR ARMS EXPORTERS, 1971-1988

(1988 US $m)

Country	Total	Percent/World
World	780,908	100.0
Soviet Union	310,711	39.8
United States	201,997	25.9
France	56,646	7.3
Great Britain	31,263	4.0
West Germany	20,490	2.6
China	19,116	2.4
Czechoslovakia	18,527	2.4
Poland	16,821	2.2
Italy	14,628	1.9
Switzerland	7,456	1.0
Yugoslavia	5,951	0.8
Israel	4,892	0.6
Bulgaria	4,663	0.6
North Korea	4,639	0.6
Brazil	4,539	0.6
Spain	4,464	0.6
Canada	4,343	0.6
Romania	4,273	0.5
East Germany	3,954	0.5
Netherlands	3,902	0.5

Source: United States Arms Control and Disarmament Agency, World Military Expenditures and Arms Transfers, Washington, D.C.: U.S. Govt. Printing Office, 1983, 1987, 1989, and 1990. Table prepared by Nicole Ball.

ENDNOTES

1. Arthur J. Alexander, "National Experiences: A Comparative Analysis." p.3.

2. Ibid., p.3

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